

[CLAIMS]

1. A method for manufacturing a Thin Film Inorganic Light Emitting Diode device, said method comprising the following steps, in order, :

(1) preparing a nanoparticle dispersion of ZnS doped with a luminescent centre by precipitation from appropriate aqueous solutions comprising zinc ions, sulfide ions and dopant ions,

(2) washing said dispersion of doped ZnS to remove non-precipitated ions,

either,

(3) mixing said washed dispersion of doped ZnS (n-type semiconductor) with a water-compatible p-type semiconductive polymer,

(4) coating said mixture, optionally after admixture with a binder, onto a first conductive electrode,

(5) applying on top of said coated layer resulting from step (4) a second conductive electrode, with the proviso that at least one of said first and second electrode is transparent,

or,

(3') coating on top of a first conductive layer a double layer pack comprising, in either order,

(3'a) a layer containing a water-compatible p-type semiconductive polymer, and,

(3'b) a layer containing said washed dispersion of doped ZnS, optionally admixed with a binder,

(4') applying on top of said coated layer pack resulting from step (3') a second conductive electrode, with the proviso that at least one of said first and second electrode is transparent.

2. A method according to claim 1 wherein said precipitation of step (1) is performed according to the double jet principle whereby a first solution containing zinc ions and a second solution containing sulfide ions are added together to a third solution.

3. A method according to claim 2 wherein said first solution also contains said dopant ions.

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4. A method according to claim 1 wherein said dopant ions are manganese ions.
5. A method according to claim 1 wherein said dopant ions are copper(I) or copper(II) ions.
6. A method according to claim 1 wherein said washing of said dispersion of doped ZnS is performed by an ultrafiltration and/or diafiltration step.
7. A method according to claim 6 wherein said ultrafiltration and/or diafiltration step is (are) performed in the presence of a compound preventing agglomeration of nanoparticles.
8. A method according to claim 1 wherein said water-compatible p-type semiconductive polymer is a polythiophene/polymeric polyanion complex.
9. A method according to claim 8 wherein said polythiophene is poly(3,4-ethylenedioxythiophene).
10. A method according to claim 8 wherein said polymeric polyanion is polystyrene sulphonate.
11. A method according to claim 1 wherein said first electrode is an Indium Tin Oxide (ITO) electrode.
12. A method according to claim 1 wherein said second conductive electrode is an aluminum electrode applied by vacuum deposition.
13. A Thin Film Inorganic Light Emitting Diode device manufactured according to the method of any of the previous claims.

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